Telling the Safety Performance Story: Using a Needs-Results Hierarchy for Planning and Measuring Progress in System Safety

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February 11, 2010
Agenda

- Defining expected results and results chains in system safety situations
- Sorting risks via spheres of influence
- Using a Needs-Results Hierarchy for planning and management
Without changing our patterns of thought, we will not be able to solve the problems we created with our current patterns of thought.

Things should be made as simple as possible – not simpler.

-Albert Einstein
The Current Regulatory Situation:

- Accountability
- Complexity
- Dynamism
- Tools for performance measurement and assessment are inadequate
  - Scorecards – Dashboards [Simple Matrices]
  - Compliance rates
  - Process measures
  - Audit
  - Evaluation
Problem: The Reasons for Doing Performance Planning and Measurement

- Contrasting World Views and Paradigms
The Problem with Traditional Measurement and Accountability Applied to Modern Public [Regulatory] Performance:

- Most Performance Measurement is “disaggregationist”, while strategic management requires synthesis
- Balanced vs. integrated thinking (Sparrow)
- Tendency to emphasize linear thinking
- Standardized metrics (e.g. speed, compliance level – Sparrow)
- Implied command and control
- Efficiency over effectiveness (Sparrow)
Case Example: Walkerton

- Thousands rendered ill, 7 die from ecoli contaminated municipal water
- Regulations ‘stiffened’ almost immediately – lots of risk shifting and paper burden to small community well operators
- 2 year O’Connor enquiry
- Blame essentially laid on local officials
- Assessment of water regulations? / risk management?
- Was this a deeper systems problem?
The Need:

- Recognize a different definition of accountability – based on learning and managing for results (i.e. You are accountable for learning and adapting, not for a given outcome *per se*).

- Tell a Performance Story
  - How, Who, What, Why

- Change our mental models to recognize
  - synthesis
  - interaction
  - ‘communities’ (people with some common task, function or identity in the system)
  - performance measures as progress markers
A Deeper Aspect of the Current Problem

- Many results models for programs prove inadequate in describing programs, initiatives and cases
  - Too linear
  - Either too complex or too simple
  - Miss key community behaviours
  - Analysis vs. synthesis
  - Miss an important question: What problem(s) are we solving?
Analysis vs. Synthesis

In analysis, something that we want to understand is first taken apart. In synthesis, that which we want to understand is first identified as a part of one or more larger systems.

In analysis, the understanding of the parts of the system to be understood is ... aggregated in an effort to explain the behavior or properties of the whole. In synthesis, the understanding of the larger containing system is then disaggregated to identify the role or function of the system to be understood.

- Ackoff
Need to Recognize That Results Occur In Different ‘Communities’ or Levels

End Outcomes

Broad Community of interest

Target Community of influence

Community of Control

Immediate & Intermediate Outcomes

Resources – Activities - Outputs

In fact, these communities are related and interact with each other.
## Table 8-1. Classifications of Business Results

**Tier 1. Effects, impacts, and outcomes** (environmental results, health effects, decline in injury and accident rates)

**Tier 2. Behavioral outcomes**
- a. Compliance or noncompliance rates (significance…)
- b. Other behavioral changes (adoption of best practices, other risk reduction activities, “beyond compliance,” voluntary actions, and so on)

**Tier 3. Agency activities and outputs**
- a. Enforcement actions (number, seriousness, case dispositions, penalties, and so on)
- b. Inspections (number, nature, findings, and so on)
- c. Education and outreach
- d. Collaborative partnerships (number established, nature, and so on)
- e. Administration of voluntary programs
- f. Other compliance-generating or behavioral change-inducing activities

**Tier 4. Resource efficiency, with respect to use of**
- a. Agency resources
- b. Regulated community’s resources
- c. State authority

State
(Why? – Tier 1)
Your environment of *indirect influence*

e.g., Broad international communities, communities of interest where you do not make direct contact

Behavioural Change
(Who and What? – Tier 2)
Your environment of *direct influence*

e.g., People and groups in direct contact with your operations

Operational
(How? – Tier 3)
Your operational environment
You have *direct control* over the behaviours within this sphere

Changes to Support Climate
Participation / Reaction
Awareness / Understanding
Ability / Capacity
Action / Adoption

Spheres of Influence
(Sparrow meets Van Der Heijden)
Personal Water Craft (PWC) Safety – Early 2000s External Assessment

- Boating families with teenagers
- Unsafe PWC boating practice
- Use of PWCs by young people
- New availability of PWCs
- Unclear legal status for PWCs
- Less provincial policing of inland lakes
- Government financial pressures
- PWC boating accidents

Office of Boating Safety
Personal Water Craft (PWC) Safety – Early 2000s Internal Assessment

Office of Boating Safety

WEAKNESSES / CONSTRAINTS
- Resource limitations
- Lack of ‘presence’
- Lack of PWC experience
- Unclear legal mandate situation

STRENGTHS
- Boating safety knowledge
- Credibility
Note that the above logic involves garnering regional police and community support to help influence PWC operators. Also note that as the behaviours occur farther and farther away from the operational circle, an organization's ability to influence change is reduced. In this fact lies the analogy of behavioural 'wave' – sharp and forceful near the origin, broader and weaker (subject to disruption by other forces) as it moves outward.
Developing a Needs-Results Hierarchy as a ‘Front End’

- Focus on important problems and priorities
- Develop a chain of results leading to outcomes
- Focus on human change
- Distinguish control from influence
The Needs-Results hierarchy sets results in the context of a given situation and set of needs.

Adapted from Claude Bennett, TOP Guidelines
Shaping the Results Hierarchy

Situation/ Needs Assessment

- Conditions
- Practices
- Capacity
- Participation
- Support Climate
- Activities

Results Chain

- Start
- End Outcomes
- Action / Adoption
- Capacity
- Participation / Reaction
- Partner / Rules Support
- Activities
- Resources

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Example: Storage and Transportation of Dangerous Goods
(Source: Transportation of Dangerous Goods, Transport Canada, 2002)

**Situation/ Needs Assessment**

**Conditions**
- Unsafe transportation of anhydrous ammonia

**Practices**
- 100% non-compliance in all 43 high priority (C1) sites
- Few facilities voluntarily registered with TIFO
- Little knowledge of the program and lack of understanding of the technical aspects of compliance requirements by individual nurse tank owners
- Lack of awareness, engagement and support by high priority sites

**Capacity**
- Little cooperation with Ammonia Safety Council and TC headquarter specialist to improve the PELS and Ammonia Field Tank Safety Program

**Participation**
- Lack of audit compliance rigor
- Outreach activities highly IPS-based
- High number of repeat inspections

**Support Climate**
- Lack of awareness, engagement and support by high priority sites
- 10 Inspectors for 43 anhydrous sites

**Activities**
- 1 Inspector for 43 anhydrous sites
- Decrease in travel dollars

**Resources**
- High travel dollars

**End Outcomes**
- Safe transportation of anhydrous ammonia
- Anhydrous nurse tank operators are self-regulating
- 95% compliance with the TDG regulations, the Ammonia Safety Council Program and PELS
- All facilities in Ontario operating nurse tanks in anhydrous service are registered with TIFO

**Action / Adoption**
- Individual nurse tank owners have the tools to comply and self-regulate
- Increased awareness, engagement and support by high priority sites
- Increased cooperation with the Ammonia Safety Council and TC headquarter specialist to improve the PELS and Ammonia Field Tank Safety Program

**Participation / Reaction**
- Improved audit function to verify compliance and revoke certificates
- Continued outreach activities (IPS, TSS, ED, IA, AB) especially in terms of awareness building workshops
- Decrease in inspections

**Capacity**
- Increased awareness, engagement and support by high priority sites

**Partner / Rules Support**
- Improved audit function to verify compliance and revoke certificates
- Continued outreach activities (IPS, TSS, ED, IA, AB) especially in terms of awareness building workshops
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A Case Study in [lack of] Regulatory Harm Reduction Accountability – The Walkerton Water Situation

A two year inquiry held two town officials almost completely to blame. Deeper systems surrounding the situation were not extensively reviewed.

Source: Montague, Steve, A Regulatory Challenge Conference, 2000
A Needs-Results Hierarchy Approach – Walkerton

**Situation / Needs Assessment**

- **Conditions**
  - Weather factors
  - Economic Pressures
  - S&T developments re: farming

- **Practices**
  - Farmers ‘factory farming’ animals, routine feeding of antibiotics, manure spreading
  - Poor ‘stewardship’ practices over rural water supplies (from gaps in testing to fraudulent behaviour)

- **Capacity**
  - Poor knowledge, understanding and waters stewardship commitment
  - Ageing infrastructure

- **Support Climate**
  - Prescribed testing, lack of harmonized, multi-government support, burden imposed on water managers

- **Participation**
  - Lack of broad community engagement in water quality issues
  - Traditional, isolated services, certification, inspections, testing

- **Activities**
  - Gaps in Ministry funding and in-house expertise

**Participation / Reaction**

**Capacity**

**Action / Adoption**

**End Outcomes**

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- **Resources**
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**Participation / Reaction**

- **Activities**
  - Increase Ministry expertise in-house, and acquire more $ resources

**Partner / Rules Support**

- **Capacity**
  - Demonstrated understanding of water supply safety issues by all concerned

**Action / Adoption**

- **End Outcomes**
  - Safe, environmentally friendly water supply
  - Sustained stewardship practices by all communities
    - Testing
    - Maintenance
    - Certification
    - Reporting / learning / changing

- Harmonized support of all level of Government, Local Medical Officer, Municipalities etc. in policy, legislation, regulation, inspections and info. sharing

- Awareness, engagement and involvement of all key communities

- Consultation, collaborative development, capacity building, monitoring, learning and follow through

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Needs – Questions

**Conditions**

What need/gap is your group/policy/program trying to fill?

What is the current state of affairs?

**Practices**

What are the practices currently being employed?

How do your partners and those you are trying to reach influence the current state of affairs?

**Capacity**

What gaps exist in your target population’s Knowledge? Abilities? Skills? Aspirations?

**Support Climate**

What is the current state of the support climate? What gaps exist in terms of support climate? (i.e., Are there gaps in legal rules, current international, federal, provincial, regional (governmental or non-governmental) institutional policies, etc...?)

**Participation**

Are there problems or gaps in the participation/engagement of groups which are key to achieving your objectives?

**Activities/Outputs**

Are there activities or outputs which represent barriers or gaps to achieving your objectives? (e.g., inappropriate delivery practices, incomplete or inappropriate assessment criteria, gaps in communications, etc).

**Resources**

What level of financial, human, and “technical” resources are currently at your disposal? Are there gaps?

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Results – Questions

End Outcomes
What is the ultimate state that your group is contributing towards?
What is your vision of a “perfect world”, as it relates to your area of work?

Action / Adoption
What are the practices that are required to reach this ultimate goal?
How would your partners and those you are trying to reach act in a “perfect world”?

Capacity
What knowledge, aspirations, skills, and abilities would your partners + target groups have in a “perfect world”?

Partner / Rules Support
What partner support do you need to achieve your vision?
What kind of a support climate would you need to achieve your vision?

Participation / Reaction
Whose participation/engagement do you need to address the identified gaps?

Activities
What tasks need to be done by your group in order to address this issue?
What outputs should be produced by your group?

Resources
What resources are required to accomplish your activities?
### Example Needs-Results Chart – Sun Safety

<table>
<thead>
<tr>
<th>Needs / Situation</th>
<th>Desired Results</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Conditions</strong></td>
<td>End Result (WHY)</td>
</tr>
<tr>
<td>• Increasing incidence of sun related cancer</td>
<td>• Reduced rate of sun related cancer</td>
</tr>
<tr>
<td><strong>Practices</strong></td>
<td>Practice and Behavior Change (WHO &amp; WHAT)</td>
</tr>
<tr>
<td>• Problematic level of unsafe sun and tanning</td>
<td>• Improved / increased ‘SunSafe’ behaviours</td>
</tr>
<tr>
<td>behaviours</td>
<td>• Reduced risky tanning practices</td>
</tr>
<tr>
<td><strong>Capacity (Knowledge, Abilities, Skills and Aspirations)</strong></td>
<td>Capacity (Knowledge, Abilities, Skills and Aspirations) (WHO &amp; WHAT)</td>
</tr>
<tr>
<td>• Key segments do not know appropriate Sunsafe</td>
<td>• Understanding of what precautions to take at various UV levels</td>
</tr>
<tr>
<td>precautions for various UV levels</td>
<td>• Improved awareness of UV levels and their implications</td>
</tr>
<tr>
<td>• Lack of awareness / reactions to UV warnings</td>
<td>• Pick-up of need for shade messaging by media and various public institutions</td>
</tr>
<tr>
<td>• Lack of apparent awareness of need for shade</td>
<td></td>
</tr>
<tr>
<td>in public spaces</td>
<td></td>
</tr>
<tr>
<td><strong>Support Climate</strong></td>
<td>Support Climate (WHO &amp; WHAT)</td>
</tr>
<tr>
<td>• Inadequate institutional support for shade</td>
<td>• Improved institutional support for shade and tanning bed policies</td>
</tr>
<tr>
<td>and tanning bed policies</td>
<td></td>
</tr>
<tr>
<td><strong>Participation / Engagement / Involvement</strong></td>
<td>Engagement / Involvement (WHO &amp; WHAT)</td>
</tr>
<tr>
<td>• Lack of public / institutional / other related agency involvement in Sunsafe promotion</td>
<td>• Media pick-up of Sunsafe messaging</td>
</tr>
<tr>
<td>• Lack of opportunity for concerned group involvement</td>
<td>• Involvement of physicians groups in sun safe cases</td>
</tr>
<tr>
<td><strong>Activities</strong></td>
<td>Activities (HOW)</td>
</tr>
<tr>
<td>• Gap in promotional / educational activities</td>
<td>• Promotional / educational activities and information / communication to key target groups</td>
</tr>
<tr>
<td><strong>Resource Inputs</strong></td>
<td>Inputs (HOW)</td>
</tr>
<tr>
<td>• Gaps in resources committed to area</td>
<td>• Level of people, skills, knowledge, $ applied to Sunsafe area</td>
</tr>
</tbody>
</table>

*Source: Canadian Cancer Society with permission*
Small Group Exercise

- Look at a case
- Suggest some situational needs / risks
- Then consider some results
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Measurement Implications

1. Think of it as ‘progress’ measurement, rather than performance measurement.
2. Multiple stages = Multiple metrics over time.
3. Focus on concrete human behaviours.
4. Indicators directly relate to Needs-Results statements.
### Desired Results

<table>
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<tr>
<th><strong>End Result (WHY)</strong></th>
<th><strong>Practice and Behavior Change (WHO &amp; WHAT)</strong></th>
<th><strong>Capacity (Knowledge, Abilities, Skills and Aspirations) (WHO &amp; WHAT)</strong></th>
<th><strong>Support Climate (WHO &amp; WHAT)</strong></th>
<th><strong>Engagement / Involvement (WHO &amp; WHAT)</strong></th>
<th><strong>Activities (HOW)</strong></th>
<th><strong>Inputs (HOW)</strong></th>
</tr>
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<tr>
<td>• Reduced rate of sun related cancer</td>
<td>• Improved / increased ‘Sunsafe’ behaviours • Reduced risky tanning practices • Shade policies implemented for public areas</td>
<td>• Understanding of what precautions to take at various UV levels • Improved awareness of UV levels and their implications • Pick-up of need for shade messaging by media and various public institutions</td>
<td>• Improved institutional support for shade and tanning bed policies</td>
<td>• Media pick-up of Sunsafe messaging • Involvement of physicians groups in sun safe cases</td>
<td>• Promotional / educational activities and information / communication to key target groups</td>
<td>• Level of people, skills, knowledge, $ applied to Sunsafe area</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Level of UV related melanoma (and non-melanoma)</td>
<td>% of adults applying sun-screen (and other precautionary measures)</td>
<td>Shade policy passed, legislation and / or regulations / instruments passed (and monitored / enforced)</td>
<td>Level of media pick-up (# stories, space, reflection of message)</td>
<td># of activities conducted, milestones and deliverables met</td>
<td>Level of $ and FTE’s invested</td>
</tr>
</tbody>
</table>

*Source: Canadian Cancer Society with permission*
<table>
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<tr>
<th>Desired Results</th>
<th>Particular Concerns / Risks and Impacts (Damages &amp; Liabilities, Operational Effects, Reputation loss)</th>
<th>Existing Mitigation* Measures</th>
<th>Risk Level</th>
<th>Incremental Mitigation* Measures</th>
<th>Responsible Party</th>
</tr>
</thead>
</table>

* Note that mitigation strategies become contingency plans when risks are beyond the sphere of direct influence.
Conclusions – For Harm Reduction and Regulatory Initiatives:

- Use a structured needs assessment and a reach-results chain to:
  - Plan
  - Refine results
  - Set targets
  - Define measures
  - Set up risk plans

- Integrate:
  - Approaches
  - Stakeholders
  - Processes

- Cultivate (rather than engineer) the process
Questions

- Do current planning, reporting and ‘accountability’ approaches – as typically applied to harm reduction and regulatory oversight in complex public systems – cause problems in and of themselves?

- Can structured need (problem) assessments, systems thinking and reach-results chains be effectively incorporated into performance planning, measurement and reporting? Can this complement analytical system safety approaches? (e.g. hazard analysis)

- What are the implications for performance measurement and evaluation?
  - Strategically
  - Structurally
  - ‘Politically’
Select Sources / References


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